MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2018/2019

TCP2201 OBJECT ORIENTED ANALYSIS AND DESIGN

(All sections/groups)

24 OCTOBER 2018
2:30 P.M – 4:30 P.M
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 7 pages with 4 questions only.
2. Answer **ALL QUESTIONS**.
3. All questions carry equal marks (25 marks) and the distribution of the marks for each sub-question is given.
4. Write your answers in the answer booklet provided.

Question 1

a) Explain the differences between overloading and overriding object methods. [4 marks]

b) How does the keyword "final" affect class declarations, class methods, and variables of a class? For each explanation, show an example of how the "final" keyword is applied using Java. [6 marks]

c) The following code defines a Book class using Java:

```
public class Book {
   private String title;
   private String author;
   private String callNumber;

   public String getTitle()
   { return this.title; }
   public String getAuthor()
   { return this.author; }
   public String getCallNumber()
   { return this.callNumber;}

   public void setTitle(String bTitle)
   { this.title = bTitle;}
   public void setAuthor(String bAuthor)
   { this.author = bAuthor;}
   public void setCallNumber(String bCN)
   { this.callNumber = bCN;}
}
```

Complete the class by adding in two (2) constructors – one as a default constructor and one as a parameterized constructor taking in three (3) parameters. Both constructors will initialize all the class' variables correctly with the default constructor initializing them all to be null or empty strings. [6 marks]

d) Rewrite the following Java code excerpt using only if-else statements. In your code, you can assume that the number variable is of char datatype. HINT: Note that the question makes use of one of the requirements for the switch-case control structure and should be translated over correctly.

```
switch (number) {
  case '3':
    System.out.println("three");
  case '2':
    System.out.println("two");
  case '1':
    System.out.println("one");
  default:
    System.out.println("blastoff!");
}
```

[9 marks]

Continued...

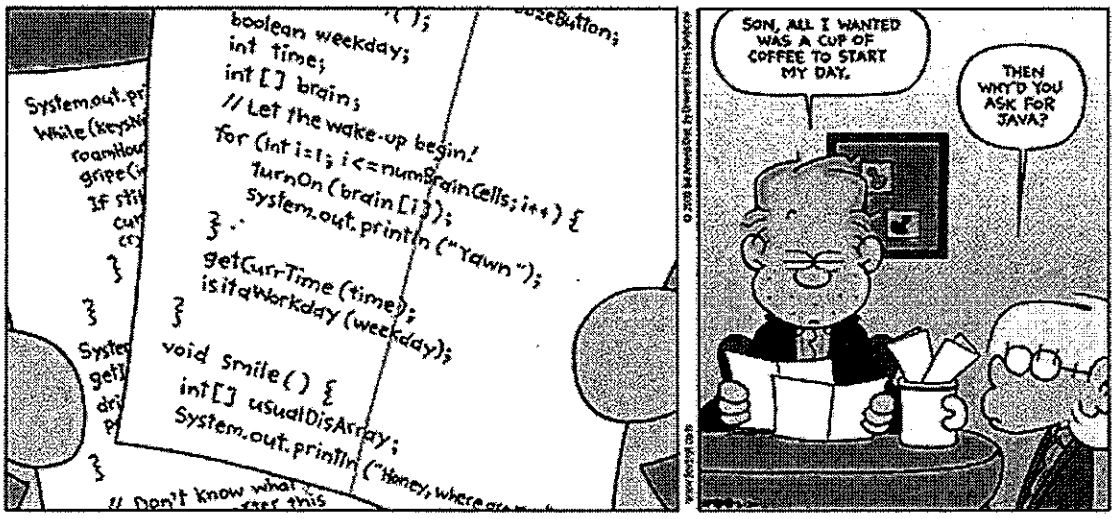
Question 2

a) There are 6 steps of identification in generating a class diagram. List the all 6 steps and explain the identification step you find most important. [7 marks]

b) There are many phases in typical requirements and specification in software projects activities. How many phases does it navigates through? List all of the phases and explain the 1st and 2nd phases. [8 marks]

c) Many projects are evolutionary or maintenance projects, involving work on legacy systems. List out 4 types of these projects. Fantasy Sdn Bhd is a property management company. They want to change their maintenance collection and management system internally so that it is more maintainable and faster, however the functionally of the system still works the same. What type of software project is this? Explain your answer. [6 marks]

d) What are the targets for cohesion and coupling that lead to good software design? Explain the difference between cohesion and coupling. [4 marks]



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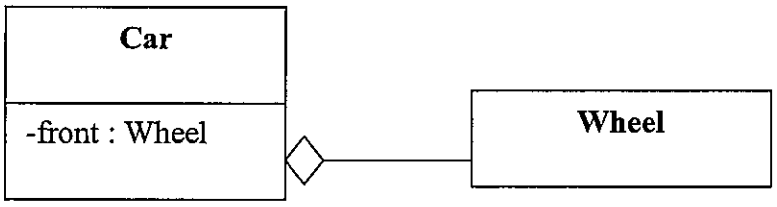
Question 3

a) Explain the difference between an "is-a" relationship and a "has-a" relationship. Give an example each. [6 marks]

b) Study the UML diagram below, explain the relationship and convert diagram into a Java program. [4 marks]



c) Draw the UML class diagram for the Java program below. [5 marks]

```
class Staff {
 protected int age = 0;
 private String name;
 public Staff() {
  System.out.println("Staff() age = " + age);
 }
 public Staff(int age) {
  this.age = age;
  System.out.println("Staff(age) age = " + age);
 }
  public String getName()
  {
    return name;
  }
}

class Secretary extends Staff{
 private String name;
 Secretary() {
  System.out.println("Secretary(i) age = " + age);
 }
 Secretary(int age) {
  System.out.println("Secretary(i) age = " + age);
 }
}
```

Continued...

d) You are developing a costume rental software system for a store. The details of the software portion are as follows:

- Only rents costumes and dresses. The store does not sell anything at all.
- There are various types of costumes and dresses available
- The rental charge is fixed depending on the type of dress or costume
- Each customer has a separate membership and can login to perform online transactions (e.g. search, select dresses, reserve etc)
- The store takes RM100 as registration deposit
- The deposit is refunded when membership is cancelled by the member.
- Employees handle rental transactions made by customers.
- Employees also handle the updating of information on available costumes or dresses in the inventory

Identify the use-cases and actors in the software description above and draw the resulting UML use-case diagram. [7 marks]

Draw the actor 'customer' using the class diagram representation. You may add whatever details necessary to complete the class diagram but include at least two (2) methods. [3 marks]

Continued...

Question 4

a) Please state what category these design patterns are in, and explain what each one means.

- Builder
- Facade
- Iterator

[9 marks]

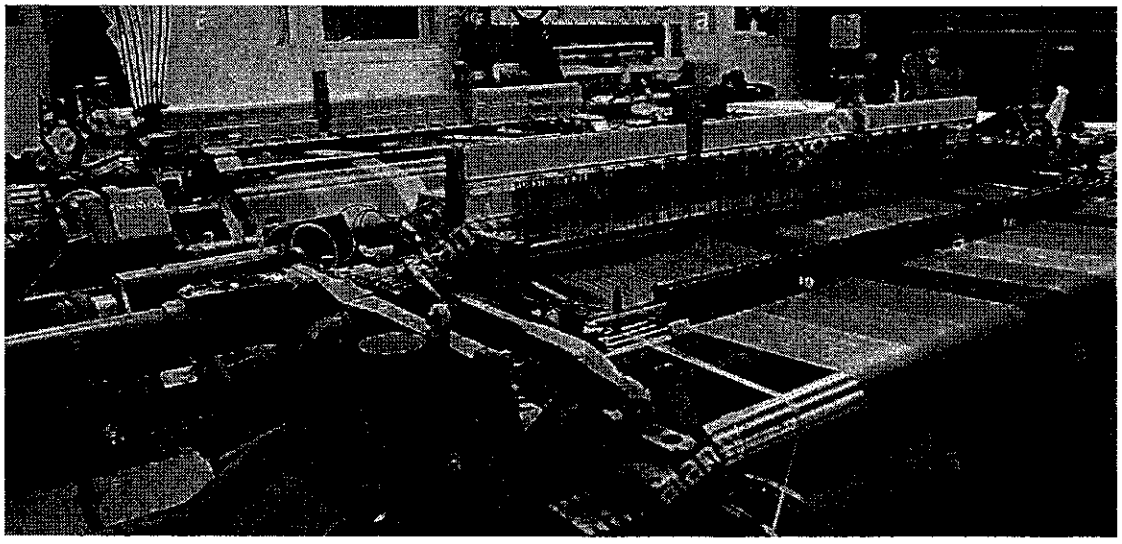
b) You have been hired by Nozia Textiles Sdn. Bhd. Nozia has an existing software called Binox, which controls their weaving machines. However, it is very old and has an unfriendly user interface. Fortunately, Binox does have an API which allows control of the weaving by other programs.

Nozia has also recently purchased the FactoryMaster software, which uses modern industrial automation standards to control factory machinery. Unfortunately, Binox does not conform to those standards.

You now have to get FactoryMaster to work with Binox.

What design pattern would you use for this scenario? Explain why you would choose this design pattern. You are not required to provide a class diagram, but you may use one in your explanation if you want to. [6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.



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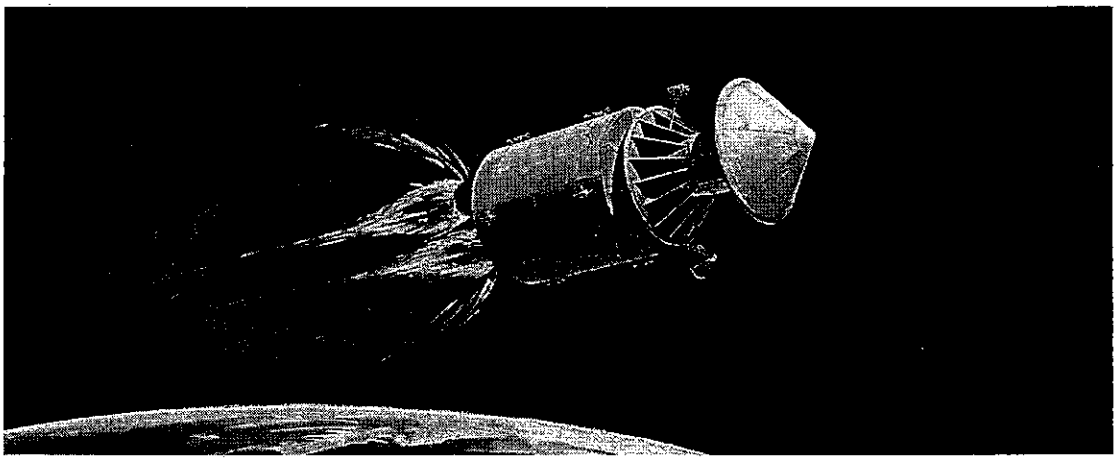
c) You are writing the driver for a sensor array called Mazila, which will be used by the MASA (Malaysian Aeronautics and Space Administration). This sensor will be used in MASA space probes in the future.

You need to design the driver for Mazila so that various pieces of software for future space probes can register their interest when Mazila senses something.

What design pattern would you use for this scenario? Explain why you would choose this design pattern. You are not required to provide a class diagram, but you may use one in your explanation if you want to. [6 marks]

Warning: No marks will be given if you do not explain why you chose this design pattern. If there is more than one possible design pattern, you must only choose one, and your explanation will partially determine if your choice is reasonable or not. If you name more than one, only the first one will be marked.



d) Create a scenario like what you have seen in parts b and c, where the façade design pattern is the correct solution. Explain why it would be the correct solution for your scenario. [4 marks]

End of paper